(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau

ganization ational Bureau

1 (111) 111 (111) 11 (111) 111 (111) 111 (111) 111 (111) 111 (111) 111 (111) 111 (111) 111 (111) 111 (111) 111

(43) International Publication Date 15 January 2004 (15.01.2004)

PCT

English

(10) International Publication Number WO 2004/005951 A3

(51) International Patent Classification⁷: G01R 33/385

(21) International Application Number:

PCT/IB2003/002871

(22) International Filing Date: 13 June 2003 (13.06.2003)

(25) Filing Language:

(26) Publication Language: English

(30) Priority Data: 02077687.8 4 July 2002 (04.07.2002) E

- (71) Applicant (for all designated States except US): KONIN-KLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): ROOZEN, Nicolaas, B. [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). BILOEN, David [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). OVERWEG, Johannes, A. [NL/NL]; c/o Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).
- (74) Agent: WOLFS, Marc, J., M.; Philips Intellectual Property & Standards, Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

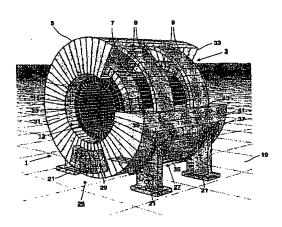
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report:

[Continued on next page]

(54) Title: AN MRI SYSTEM WITH A CONDUCTIVE MEMBER HAVING A DAMPING EFFECT FOR VIBRATIONS



(57) Abstract: The invention relates to a magnetic resonance imaging (MRI) system (1) comprising a damping member (25, 27) which is mounted to a part (5) of the MRI system susceptible to vibrations relative to the magnetic field during operation. Said damping member comprises an electrically conductive member (29, 35, 37) which is present in the magnetic field and in which eddy currents are generated as a result of said vibrations. The conductive member (29, 35, 37) is arranged in a secondary portion of the magnetic field at a distance from the main field portion (17), which secondary portion has a magnetic field strength which differs by more than 25% from the magnetic field strength (Bo) of the main field portion. In this manner, the distance between the conductive member and the main field portion is sufficiently large to prevent the eddy currents in the conductive member from causing unacceptable distortions of the main field portion, while, on the other hand, the magnetic field strength in said secondary portion is still sufficiently large to provide an adequate damping effect of the damping member (25, 27).

Published:

 without international search report and to be republished upon receipt of that report For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 G01R33/385

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

 $\label{eq:minimum documentation searched (classification system followed by classification symbols)} IPC \ 7 \ \ G01R$

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, INSPEC, EMBASE, WPI Data, PAJ

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to daim No.
X	EP 0 785 442 A (OXFORD MAGNET TECH) 23 July 1997 (1997-07-23) column 3, line 39 -column 5, line 22; figures 1,2	1-3,8, 11,12
X	US 5 565 831 A (DORRI BIZHAN ET AL) 15 October 1996 (1996-10-15) column 4, line 56 -column 5, line 54 column 6, line 29 -column 6, line 60; figure 2	1-3,8,12
X	EP 1 214 906 A (HITACHI MEDICAL CORP; MITSUBISHI ELECTRIC CORP (JP)) 19 June 2002 (2002-06-19) paragraphs '0016!-'0041!; figures 2-10	1-4,8,12

Further documents are listed in the continuation of box C.	χ Patent family members are listed in annex.
Special categories of cited documents: 'A' document defining the general state of the art which is not considered to be of particular relevance 'E' earlier document but published on or after the international filing date 'L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) 'O' document referring to an oral disclosure, use, exhibition or other means 'P' document published prior to the international filing date but later than the priority date claimed	 *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed Invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family
Date of the actual completion of the international search	Date of mailing of the international search report
4 December 2003	29/12/2003
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2	Authorized officer
NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Lersch, W

PCT/IB 03/02871

	tion) DOCUMENTS CONSIDERED TO BE RELEVANT	I Delever to delevate
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	DE 101 16 623 C (BRUKER BIOSPIN GMBH) 5 December 2002 (2002-12-05) paragraphs '0011!,'0028!,'0040!-'0053!; figures 1-4	1,4
A	DE 199 47 539 A (BRUKER ANALYTIK GMBH) 19 April 2001 (2001-04-19) column 3, line 60 -column 4, line 9	1
A	KATSUNUMA A ET AL: "Quiet MRI with novel acoustic noise reduction" MAGNETIC RESONANCE MATERIALS IN PHYSICS, BIOLOGY AND MEDICINE, CHAPMAN AND HALL, LONDON, GB, vol. 13, no. 3, January 2002 (2002-01), pages 139-144, XP002246720 ISSN: 1352-8661 the whole document	1
A	EDELSTEIN W A ET AL: "Making MRI quieter" MAGNETIC RESONANCE IMAGING, FEB. 2002, ELSEVIER, USA, vol. 20, no. 2, pages 155-163, XP002263702 ISSN: 0730-725X the whole document	

INTERNATION SEARCH REPORT

PCT/Ib 3/02871

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0785442	A	23-07-1997	GB DE DE EP JP US	2309305 A 69708345 D1 69708345 T2 0785442 A1 9223620 A 5982260 A	23-07-1997 03-01-2002 11-07-2002 23-07-1997 26-08-1997 09-11-1999
US 5565831	A	15-10-1996	EP JP	0770881 A1 9187439 A	02-05-1997 22-07-1997
EP 1214906	A	19-06-2002	JP EP WO	2001078982 A 1214906 A1 0119242 A1	27-03-2001 19-06-2002 22-03-2001
DE 10116623	С	05-12-2002	DE GB US	10116623 C1 2379019 A 2002140428 A1	05-12-2002 26-02-2003 03-10-2002
DE 19947539	A	19-04-2001	DE GB US	19947539 A1 2356056 A 6501275 B1	19-04-2001 09-05-2001 31-12-2002